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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15 22.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014

Date of Testing : 22.07.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **25500**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	990	990	3.9	96.1	95-100
22.4	5310	6300	24.7	75.3	60-80
11.2	5595	11895	46.6	53.4	40-60
4.75	4080	15975	62.6	37.4	25-40
2.36	3925	19900	78.0	22.0	15-30
0.600	2505	22405	87.9	12.1	8-22
0.075	2810	25215	98.9	1.1	0

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Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Bitumen/2014-15 25.07.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
SAMPLE I/D	Main Road and Cross Roads at Balaji Layout in Ward No.11
DATE OF TESTING	25.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472	477.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	28	22.50
7. Bitumen content in %	5.60	4.50
8. Average	**5.05**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	36.25	7.68	7.68	92.32	90-100
4.75	262.3	55.57	63.25	36.75	35-51
2.36	58.12	12.31	75.57	24.43	24-39
1.18	39.85	8.44	84.01	15.99	15-30
0.3	29.8	6.31	90.32	9.68	9-19
0.075	27.45	5.82	96.14	3.86	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	26.32	5.26	5.26	94.74	90-100
4.75	241.5	48.30	53.56	46.44	35-51
2.36	91.25	18.25	71.81	28.19	24-39
1.18	52.46	10.49	82.31	17.69	15-30
0.3	31.85	6.37	88.68	11.32	9-19
0.075	21.78	4.36	93.03	6.97	3-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

22.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014

Date of Testing : 22.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25250**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	985	985	3.9	96.1	95-100
22.4	5295	6280	24.9	75.1	60-80
11.2	5410	11690	46.3	53.7	40-60
4.75	4020	15710	62.2	37.8	25-40
2.36	3850	19560	77.5	22.5	15-30
0.600	2650	22210	88.0	12.0	8-22
0.075	2750	24960	98.9	1.1	0-8

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23.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014

Date of Testing : 23.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25125**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	900	900	3.6	96.4	95-100
22.4	5405	6305	25.1	74.9	60-80
11.2	5290	11595	46.1	53.9	40-60
4.75	4155	15750	62.7	37.3	25-40
2.36	3650	19400	77.2	22.8	15-30
0.600	2585	21985	87.5	12.5	8-22
0.075	2650	24635	98.0	2.0	0-8

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22.7.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	22.7.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	304	
4	Aggregate Impact value = percent fines	22.37	22.45	
	100* (W_2/W_1)%			22.41

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/S-T/2014-15 22.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager**, KRIDL, Bangalore.
Name of Work	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	22.07.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.52%**

Elongation Index = **13.06%**

Result : Combined Flakiness & Elongation index 24.58%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/AIV/2014-15 25.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	25.07.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	77	78	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	302	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.37	20.53	**20.45**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Shape_T/2014-15 : 25.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 25.07.2014

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Result : Flakiness Index = **11.89%**

Elongation Index = **13.80%**

Result : Combined Flakiness & Elongation index **25.69%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Stripping/2014-15 25.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	25.07.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.40	96.60
2	3.4		
3	3.5		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Sp_Wa/2014-15

25.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main Road and Cross Roads at Balaji Layout in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/4/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	25.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2025	2026	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1267	1270	1271	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2018	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	748	748	
6	Weight of oven dried aggregate	W_4 g	1999	2002	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.669	2.676	2.680	2.675
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.731	2.735	2.732	2.732
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.85%	0.80%	0.70%	0.78%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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